Innovative Dredging Analysis of Federally Authorized or Maintained Small Boat Harbors

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Areas of Discussion

- Background
- Harbors Study
- Results of Harbors Study
- Innovative Technique (non-traditional)

Lake of the Woods

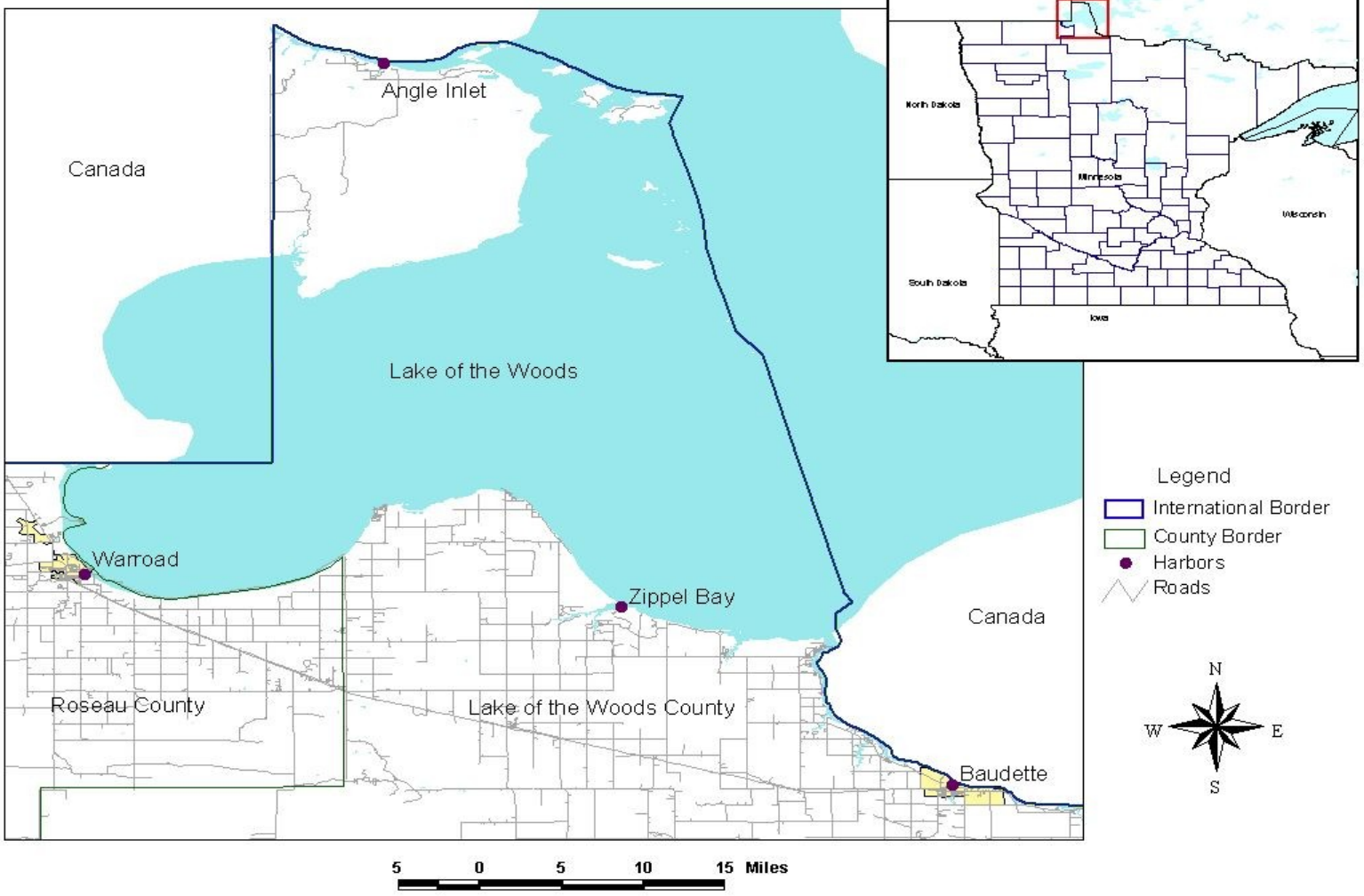
- On border between U.S. and Canada
- Covers approximately 1,490 square miles
- Approximately 65,000 miles of shoreline
- Known for fishing quality
  - Walleye
  - Muskellunge
  - Catfish

Corps-Maintained Channels

- Four Corps-maintained channels located around Lake of the Woods
  - Warroad
  - Zippel Bay
  - Angle Inlet
  - Baudette
- Maintenance activities have been limited

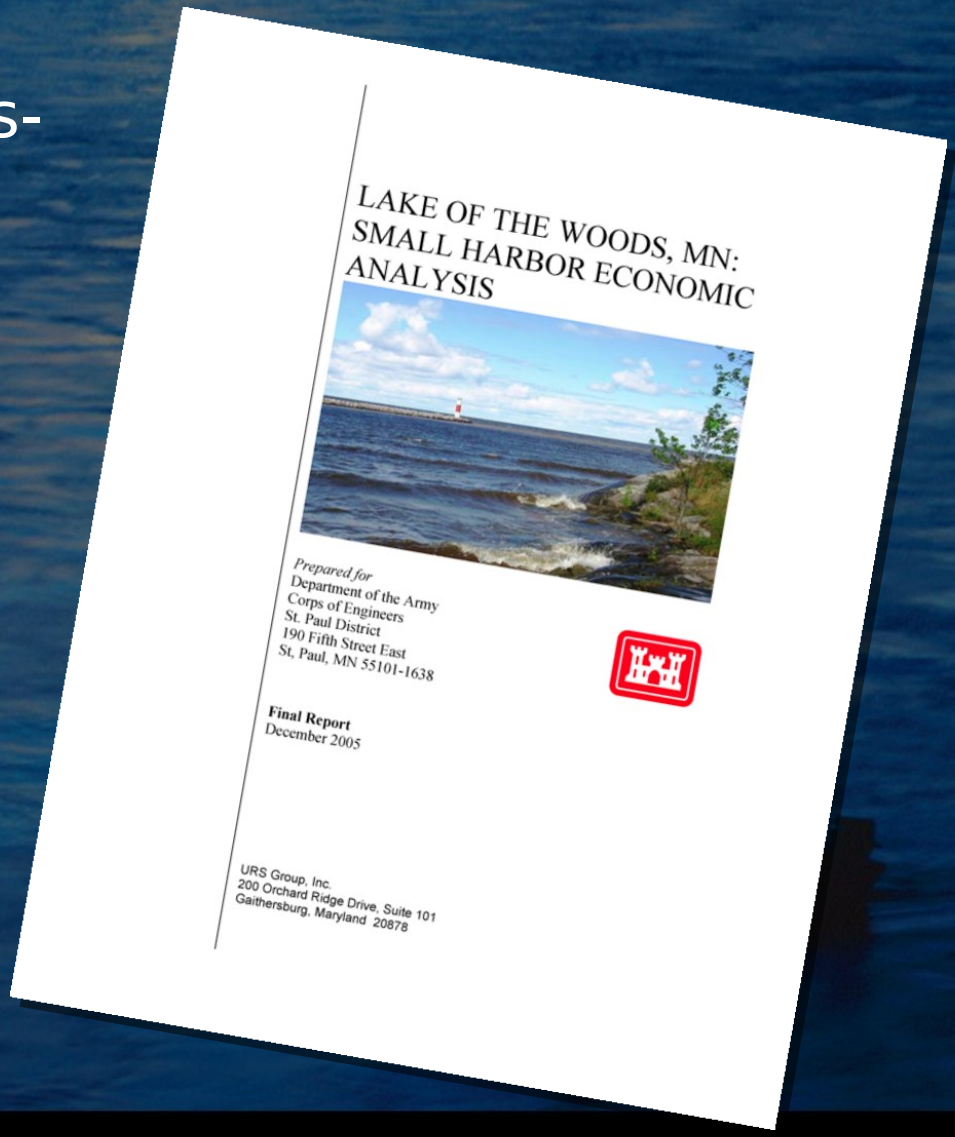
Corps-Maintained Channels

Figure 1. Study Area



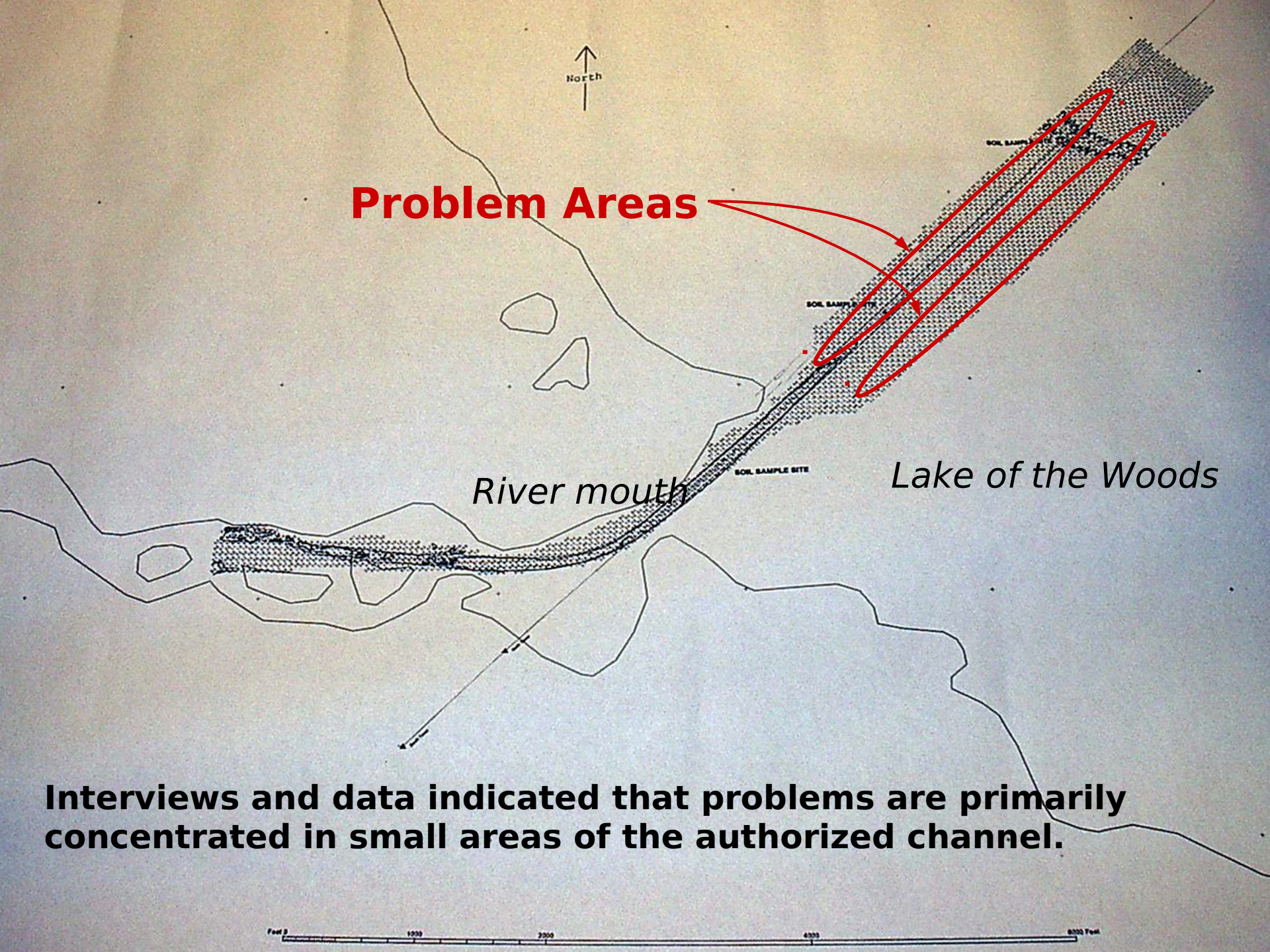
Study Objectives

- Examine existing Corps-authorized channels
- Analyze economic and social impacts
- Develop dredging scenarios, considering:
  - Timing (impacts to users)
  - Dredging method
  - Advanced dredging (over-depth)



Evaluation

- Site visit
- Conducted interviews
  - Municipal representatives
  - Business owners
  - State and federal agencies
- Used state and local data sources
  - Angling pressure
  - Water levels
- Contacted dredging companies
- Limited sedimentation data available



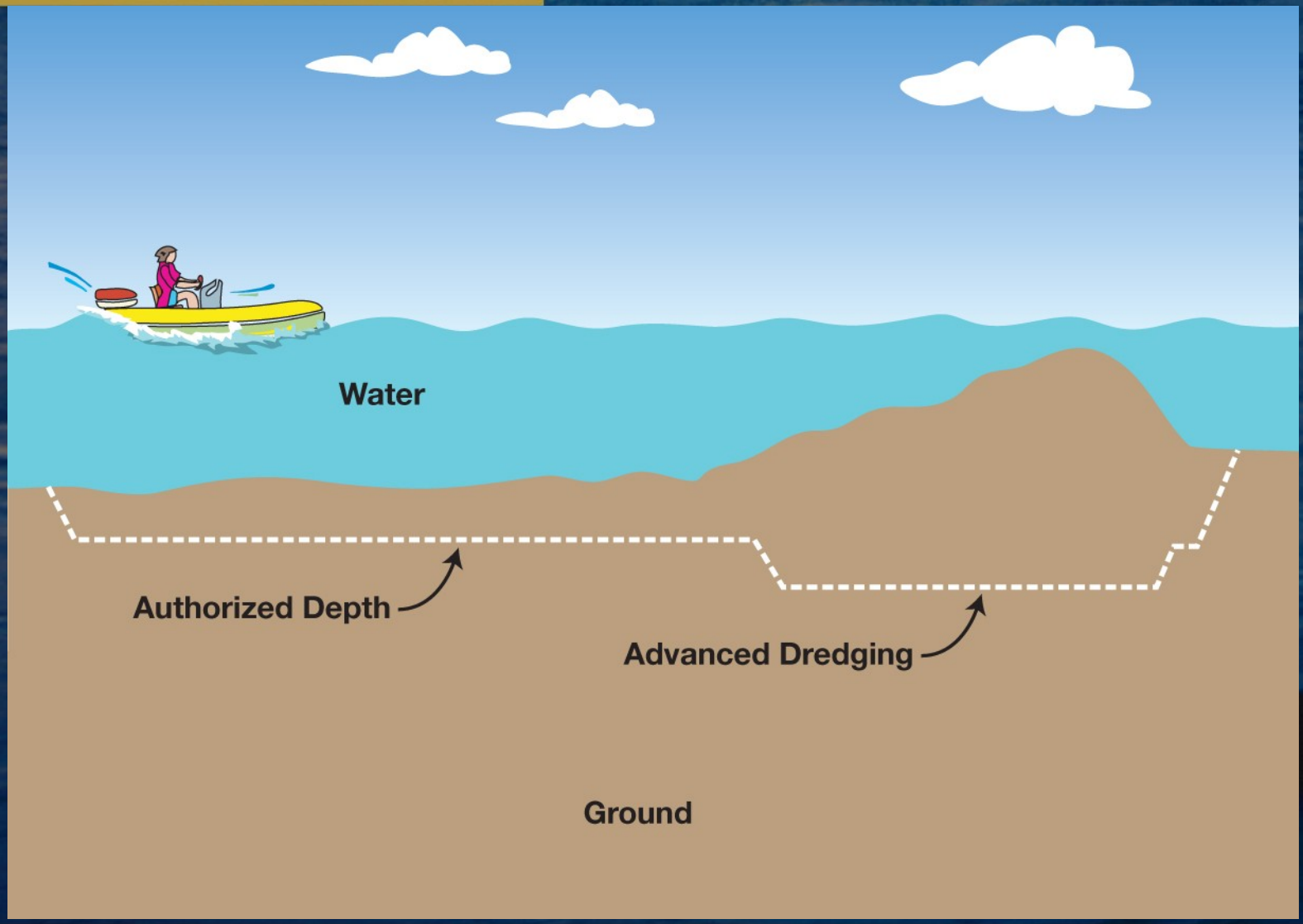
Interviews and data indicated that problems are primarily concentrated in small areas of the authorized channel.

Problem Area

Evaluated Scenarios

- Dredge to authorized depth
- Advanced dredging (over-depth)
- Dredge to authorized depth combined with advanced dredging ("step")
- Spot dredge problem areas, alternating with dredging entire channel

Scenarios



Contractor Costs

Contractor	Mob/Demobilization Costs	Dredging Costs (by type)	Disposal Costs
Marine Tech, LLC	$30,000 – $100,000	$10 – $20 /cy (hydraulic or mech.)	$3 – $15/cy
J.F. Brennan	$30,000 – $75,000 (hydraulic) $50,000 – $150,000 (mech.)	$5 – $12/cy (hydraulic) $14 – $25/cy (mech.)	Major factor in total cost
TNT Dredging Inc.	$100,000 – $150,000	$9/cy (hydraulic) $15/cy (mech.)	
Luedtke Engineering		$34/cy (mech.)	

Estimated Dredging Costs

Volume (Cubic Yards)	Dredging Through Ice	Hydraulic Dredging	Mechanical Dredging
1,000	$1,500	-	-
5,000	$7,500	-	-
10,000	$15,000	$190,000	$310,000
20,000	-	$315,000	$530,000
40,000	-	$565,000	$970,000
80,000	-	$1,065,000	$1,850,000

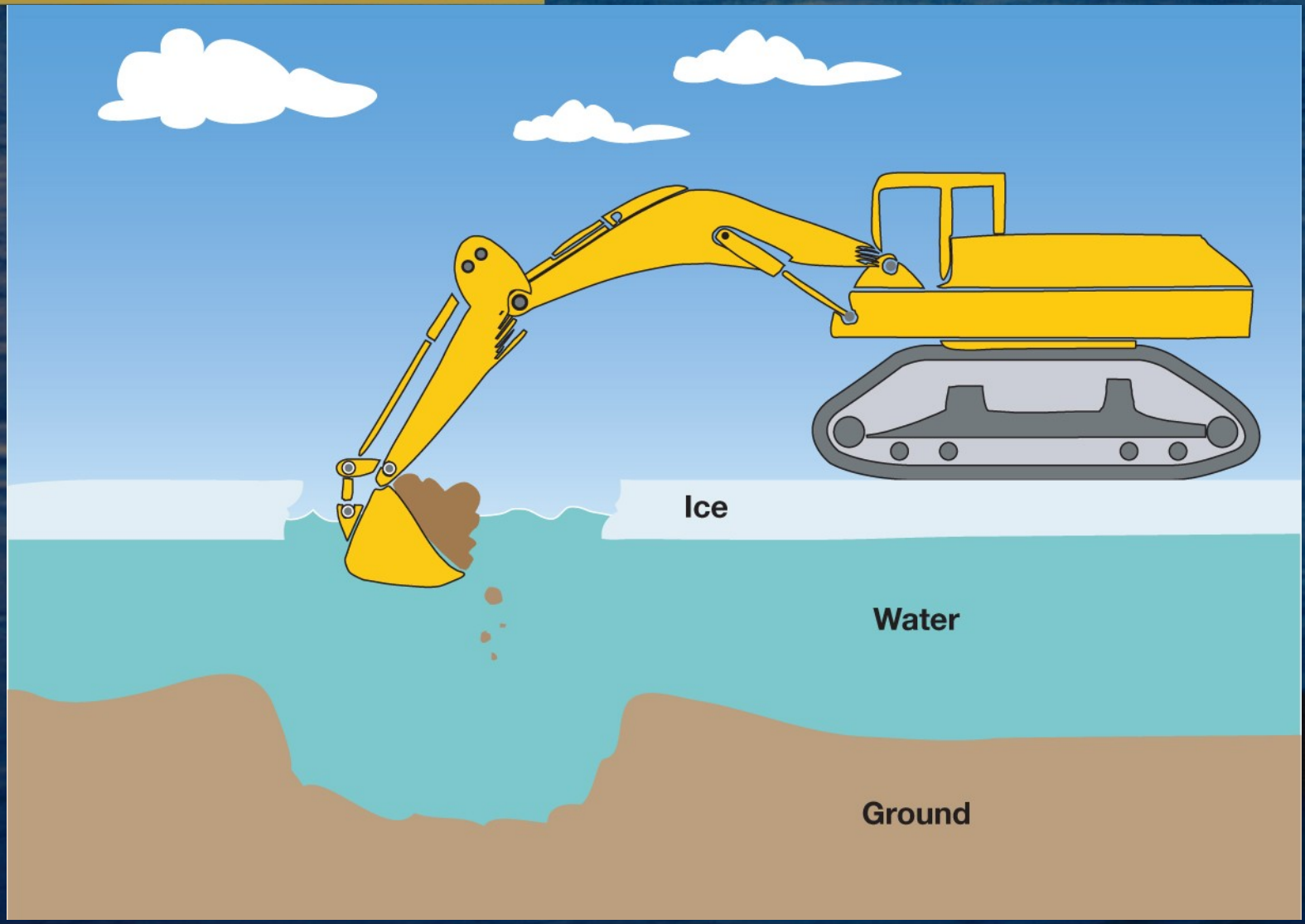
Study Results

- Harbors are an important part of the local community
  - Impact on economy
  - Considered “safe harbors”
  - Homeland Security
- Additional data are needed to determine a maintenance schedule
- Spot dredging, alternating with dredging entire channel appears to be the most cost-effective scenario
- Innovative solutions could reduce costs

Innovative Solution – Ice Dredging

- Address problem areas (spot dredging)
- Existing data supports the safe removal of material through the ice with traditional excavating equipment
- Local contractor has 8 years of experience ice dredging in private harbors

Ice Dredging



Ice Dredging

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Ice Dredging Concerns / Issues

- Safety
- Insurance
- Limited “window of opportunity”
  - Ice thickness (at least 2.5 ft)
  - Temperature (upper 10s – low 30s)
  - 3-4 week period in late winter (February – March)
- Finding contractors willing to undertake work

Ice Dredging Benefits

- Cost-effective alternative to traditional dredging
- Provides off-season revenue to local contractor (economic vitality)
- Least disruption to use of channel
- Ease of transporting dredge material